

CLAIMS:

1. A method for monitoring a process sequentially applied to a stream of substantially identical articles by a processing tool, so as to terminate the operation of the processing tool upon detecting an end-point signal corresponding to a predetermined value of a desired parameter of the article being processed, the
5 method comprising the steps of:
 - (i) processing the article with said processing tool;
 - (ii) upon completing the processing of said article in step (i) in response to the end-point signal generated by an end-point detector continuously operating
10 during the processing of said article, applying integrated monitoring to the processed article for measuring the value of said desired parameter;
 - (iii) analyzing the measured value of the desired parameter, and determining a correction value to be used for adjusting said end-point signal corresponding to the predetermined value of the desired parameter for terminating the
15 processing of the next article in the stream.
2. The method according to Claim 1, wherein in step (ii) said end-point signal is set during the processing of a first article in the stream of articles.
3. The method according to Claim 1, wherein said end-point signal is a predetermined spectrum of light returned from the article.
- 20 4. The method according to Claim 1, wherein said desired parameter is a thickness of at least an uppermost layer of the article, said integrated monitoring being capable of thickness measurements.
5. The method according to Claim 4, wherein the determination of the correction value comprises the following steps:
 - 25 - determining the difference between said predetermined value of the desired parameter and said measured value;
 - determining the ratio of said difference to the processing rate, to determine a time period on which the time processing of the article should be changed to obtain said predetermined value of the desired parameter;

- determining the value of the end-point signal corresponding to the changed processing time to be used for correcting the end-point signal for processing the next article.
- 6. The method according to Claim 5, wherein said difference is determined for at least two articles, and an average difference value is used for determining said ratio.
- 7. The method according to Claim 5, wherein said difference is determined for at least two articles, and an accumulated difference value is used for determining said ratio.
- 10 8. The method according to any one of the preceding Claims, wherein said processing is Chemical Mechanical Planarization (CMP), said processing tool being a polisher.
- 9. The method according to any one of the preceding Claims, wherein said processing is Chemical Vapor Deposition (CVD).
- 15 10. The method according to any one of the preceding Claims, wherein said processing is etching.
- 11. The method according to any one of the preceding Claims, wherein said processing is photolithography.
- 12. The method according to any one of the preceding Claims, wherein said stream of articles are semiconductor wafers.
- 20 13. An end-point detection system for use with a processing tool which is to be sequentially applied to a stream of substantially identical articles, the system comprising:
 - (1) an end-point detector accommodated within a working area defined by the processing tool when applied to the article;
 - 25 (2) an integrated monitoring tool accommodated within said processing tool outside said working area and capable of measuring a desired parameter of the article; and
 - (3) a control unit associated with the end-point detector and with the integrated monitoring tool, the control unit being responsive to data coming
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from the end-point signal for terminating the processing of the article, and to the measured data coming from the integrated monitoring tool, so as to analyze these data and determining a correction value to be applied to the end-point signal corresponding to a predetermined value of said desired parameter of the article achieved by the processing thereof.

14. The system according to Claim 13, wherein said end-point detector utilizes optical means.

15. The system according to Claim 13, wherein said desired parameter is thickness of at least an uppermost layer of the article.

16. The system according to Claim 13, wherein said stream of the articles are semiconductor wafers.

17. The system according to Claim 13, wherein said integrated monitoring tool is capable of spectrophotometric measurements.

18. The system according to Claim 13, wherein said processing is CMP.

19. The system according to Claim 13, wherein said processing is CVD.

20. The system according to Claim 13, wherein said processing is etching.

21. The system according to Claim 13, wherein said processing photolithography.

22. An CMP tool arrangement comprising a polisher, to be sequentially applied to a stream of articles, and an end-point detection system, said end-point detection system comprising:

(1) an end-point detector accommodated within a working area defined by the polisher when applied to the article;

(2) an integrated monitoring tool accommodated within said processing tool outside said working area and capable of measuring a desired parameter of the article; and

(3) a control unit associated with the end-point detector and with the integrated monitoring tool, the control unit being responsive to data coming from the end-point signal for terminating the polishing of the article, and to the measured data coming from the integrated monitoring tool, so as to analyze

these data and determining a correction value to be applied to the end-point signal corresponding to a predetermined value of said desired parameter of the article achieved by the polishing thereof.

23. An CVD tool arrangement comprising a CVD chamber, to be sequentially
5 applied to a stream of articles, and an end-point detection system, said end-point detection system comprising:

- (1) an end-point detector accommodated within a working area defined by the camera operation when applied to the article;
- (2) an integrated monitoring tool accommodated within said processing tool
10 outside said working area and capable of measuring a desired parameter of the article; and
- (3) a control unit associated with the end-point detector and with the integrated monitoring tool, the control unit being responsive to data coming from the end-point signal for terminating the deposition process applied to the article,
15 and to the measured data coming from the integrated monitoring tool, so as to analyze these data and determining a correction value to be applied to the end-point signal corresponding to a predetermined value of said desired parameter of the article achieved by the processing thereof.

24. An etching tool arrangement comprising a processing tool, which is to be
20 sequentially applied to a stream of substantially identical articles, and an end-point detection system, said end-point-detection system comprising:

- (1) an end-point detector accommodated within a working area defined by the processing tool when applied to the article;
- (2) an integrated monitoring tool accommodated within said processing tool
25 outside said working area and capable of measuring a desired parameter of the article; and
- (3) a control unit associated with the end-point detector and with the integrated monitoring tool, the control unit being responsive to data coming from the end-point signal for terminating the processing of the article, and to the
30 measured data coming from the integrated monitoring tool, so as to analyze

these data and determining a correction value to be applied to the end-point signal corresponding to a predetermined value of said desired parameter of the article achieved by the processing thereof.

25. A photolithography tools arrangement comprising a photoresist track,
5 which is to be sequentially applied to a stream of substantially identical articles for processing the article, and an end-point detection system, said end-point-detection system comprising:

- (1) an end-point detector accommodated within a working area defined by the photoresist track when applied to the article;
- 10 (2) an integrated monitoring tool accommodated within said photoresist track outside said working area and capable of measuring a desired parameter of the article; and
- (3) a control unit associated with the end-point detector and with the integrated monitoring tool, the control unit being responsive to data coming from the
15 end-point signal for terminating the processing of the article, and to the measured data coming from the integrated monitoring tool, so as to analyze these data and determining a correction value to be applied to the end-point signal corresponding to a predetermined value of said desired parameter of the article achieved by the processing thereof.